

REMARKS

Interview

Applicants thank the Examiner for the interview held on December 13, 2011. The substance of the interview is reflected in the comments below.

Claim Amendment

As suggested by the Examiner, the claims are clarified in that the “two layers” which may contain one or more layers are further clarified to be “two sub-layer systems.”

Additionally, again as suggested by the Examiner, the term “may” was removed from before the term “contain” to even further indicate that what follows is not optional. Such was already clear because the entire term in the claim was “each of the two layers may contain one or more layers,” clearly meaning that each layer itself may have sub-layers.

Since all claim amendments are only clarifying claim amendments which do not change the scope of the claims, and which were all suggested by the Examiner, the entry thereof is respectfully and courteously requested.

Claim Rejections Under 35 USC § 103

The Office Action maintained the rejection of claims 1-3, 5-6, 9-10 12-14 and 16-20 over Shimokawa in view of Harrison and Harris, the rejection of claim 4 over Shimokawa in view of Harrison and Harris and in further view of Hiller, the rejection of claim 7 over Shimokawa in view of Harrison and Harris and in further view of Delp, and the rejection of claims 11 and 15 over Shimokawa in view of Harrison and Harris and in further view of Busch.

During the interview, the meaning and scope of the term “welded” was discussed as such affects the appropriateness of the prior art rejections.

The Examiner suggested that such term is very broad and indeed includes all types of things that could happen when a laser hits a material, including ablation or sublimation whereby a hole is formed.

Applicants respectfully disagree with said claim term interpretation even under the broadest reasonable standard.

It is clear even on the face of the claim that such term does not include ablation. Claim 1 recites said term in the following context: “durably welded to the plastic surface.” In context it is clear that such could not reasonably mean the formation of a hole, e.g., welding

to the surface must mean attaching or bonding or melting or transferring something to the surface, and not ablating. By ablation, nothing would be welded to the surface, but instead a hole would form in the material of the surface.

The specification further supports the above. See, for example, the paragraph spanning pages 3-4:

Compared with the prior art, the laser energy in the present invention is not used for sublimation of the colorants or melting of glass pigments, but instead for welding of the polymer component in the inscription medium to the plastic surface. Colour-fast marking and inscription is achieved by homogeneously warming a polymer-containing inscription medium and at the same time avoiding local thermal overheating. (Emphasis added.)

See also the first full paragraph on page 4 of the specification:

In the process according to the invention, the polymer component in the inscription medium is softened or melted by means of laser energy. The polymer component dissolves together with the colorants of the inscription medium and is then durably welded to the plastic surface. (Emphasis added.)

As such, the specification is explicitly clear that “welding” excludes the “sublimation” of materials, and instead includes the softening, melting or dissolving of materials which durably weld to the surface.

In other context in the specification, the term “welded” again is consistently used to mean bonding, etc. See the second full paragraph on page 4 of the specification:

The support layer (1”) and layer (3) are strongly bonded to one another, for example by welding, adhesive bonding, lamination, etc. (Emphasis added.)

Although not necessary in view of the strong intrinsic record, attached are two references from the internet which further support that the term “durably welded to the plastic surface” by laser action is absolutely clearly understood by those of skill in the art to mean “joining” to the plastic surface by laser action, and does not in any way include sublimation of the material whereby a hole would be formed.

The reference titled “Welding of Plastics” by Amit Mukund Joshi was printed from <http://www.metalwebnews.com/howto/plastics/welding-plastics.pdf> and provides in its first and last two paragraphs the following:

Mechanical fasteners, adhesives, and welding processes

can all be employed to **form joints** between engineering plastics. Mechanical fasteners can join two components quickly, but they do not provide leak tight joint, and the localized stresses may cause them to pull free of the polymeric material. Adhesives can provide good properties and fully sound joints, but they are difficult to handle and slow to cure. Also joint preparation & surface cleanliness need to be given importance in adhesive bonding. **Welding can be used to produce bonded joints with mechanical properties that approach those of parent material. The plastic welding is confined to thermoplastic polymers because these materials can be softened by heat.** Thermosetting polymers once hardened cannot be softened again on heating. The heat required for welding thermoplastic polymers is less than that required for metals.

...

Laser welding is suitable for joining both sheet film and molded thermoplastics. It uses a laser beam to melt the plastic in the joint region. The laser generates an intense beam of radiation (usually in the infra red area of the electromagnetic spectrum) which is focussed onto the material to be joined. This excites a resonant frequency in the molecule, resulting in heating of the surrounding material.

Laser welding is a high volume production process with the advantage of creating no vibrations and generating minimum weld flash. The benefits of a laser system include; a controllable beam power, reducing the risk of distortion or damage to components; precise focussing of the laser beam allowing **accurate joints to be formed**; and a non contact process which is both clean and hygienic. Laser welding may be performed in a single-shot or continuous manner, but the materials to be joined require clamping. Weld speeds depend on polymer absorption.
(Emphasis added.)

The reference titled "Plastics Processes" printed from <http://www.bpf.co.uk/plastipedia/processes/default.aspx> , consistently with the above, provides in its section 3.1 that **"Plastic Welding ... [is] Post moulding joining of the parts."**
(Emphasis added.)

With the correct interpretation of the claim term "welding" the rejections cannot be maintained.

The following comments address the specific allegations made in the final Office Action.

All the allegations from the previous Office Action are repeated in the final Office Action, with new allegations being present only in the Response to Arguments section.

Applicants stand by their previous remarks and hereby incorporate them from the last Reply, and provide comments on the new allegations from the Office Action below.

At page 8, lines 4-5 of the Office Action it is alleged that: “*Shimokawa discloses the color film 11 is permanently welded to the substrate 10 as shown in Fig.4*”

Fig. 4 of Shimokawa is explained in col.4, lines 4-12: “Thereafter the films 11 and 13 are integrally removed from the marking surface of the work 1 as shown in Fig.4. The removed films 11 and 13 can be used effectively as a recording label ... because the information denoted by the hole 11a of the film 11 is sophisticatedly identical with the information denoted by the recess 10a of the work 1.”

The above clearly explains in sum that:

- the color film 11 is removed from the substrate 10 (10 is the surface of the work piece 1)
- no part of the color film 11 is transferred by any method, let alone by welding, to the surface 10 !! Instead, it is clearly demonstrated in figure 4 and explained in the disclosure that film 11 along with 13 are **removed**.
- the marking in the label layer 11, called “color film,” is a hole, made by laser action
- the marking in the substrate layer 10 which is the surface of the work pieces, i.e., an automotive (material unknown) is a recess, made by the same laser action,
- none of the markings is “a colored inscription or marking onto a plastic surface” as claimed in present claim 1.

Noted is that welding, in the case of the present application is a sort of fusion welding, since it relies on a softening or melting process, i.e., is a process that relies upon melting to join materials of similar compositions and melting points. This is in contrast to solid-state welding which does not involve melting of materials. For support, see, e.g., the bottom of page 3 to top of page 4 of the disclosure for the following:

Compared with the prior art, the laser energy in the present invention is not used for sublimation of the colorants or melting of glass pigments, but instead for welding of the polymer component in the inscription medium to the plastic surface. Colour-fast marking and inscription is achieved by homogeneously warming a polymer-containing inscription medium and at the same time avoiding local thermal overheating.

In the process according to the invention, the polymer component in the inscription medium is softened or melted by means of laser energy. The polymer component dissolves

together with the colorants of the inscription medium and is then durably welded to the plastic surface.

Although in Shimokawa it is mentioned that the material of the color film 11 and of the surface 10 may melt by laser action, it is described that the material melts away (vaporizes, ablates) in order to leave holes and recesses in the corresponding layers (col. 3, line 55 to col. 4, line 3). This is in clear contrast to the situation in the present application.

The Office Action further alleges on page 8, lines 5-6 that: *“The abortion [absorption] layer (13) and the inscription medium (2) are separated layer”*

Contrary to the allegation, Layer (13) is a transparent layer made of a polyester resin or a vinyl chloride based resin (col. 3, lines 36-39). This layer is also called “the second layer” in the text, see col. 2, lines 3-16, lines 22-27, lines 42-46. This layer is light and laser transmissive and is not changed by laser action. See column 2, lines 3-16 identifying the function of this layer as “transilluminating the visible ray.” In no way, this layer (13) is a laser absorption layer as asserted by the Office Action. Nowhere does Shimokawa teach or even remotely suggest such to be the case. Where a layer is described that absorbs, such is clearly described to be the case (see column 2, lines 6, identifying the first layer absorbing a visible ray (which is clearly not layer (13), which is identified as the second layer).

Also note is that element (2) is a computer, see col. 3, lines 8/9. Element (12) must have been intended by the Office Action, which is an adhesive layer which holds the label on the surface of the work piece while laser action occurs (col. 3, line 31).

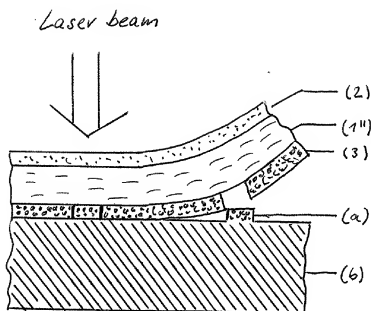
Instead of the facts being as alleged, the laser absorbing layer in Shimokawa is layer 11, the “color film.” “The laser beam is absorbed by the color film 11 and the work 1 because of the wave length.” (See col. 3, lines 56-58). This film contains the absorber material (it is made of aluminium, a metal which absorbs the laser beam (col. 3, line 39). This layer is also the inscription medium if there is any in Shimokawa, although it does not contain any colorant, contrary to the next allegation in the Office Action on page 8, line 6: *“Layer (11) containing colorant and polymer component (13) is present.”*

It appears that the Office Action might regard layers (11) and (13) in Shimokawa as the second layer in the claims which serves as the inscription medium and comprises a colorant and a polymer component (this layer may contain one or more layers), while at the same time treating layer (13) as the first layer also. However, this construct of layer system 11/13 would neither contain a colorant which is transferred to the receiving surface nor a polymer component which is molten and transferred together with the colorant. (See present

claim1.) Indeed, none of the materials of the layer system 11/13 of Shimokawa is transferred (welded) to any receiving surface.

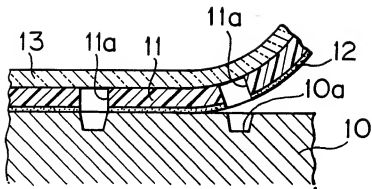
In addition, the absorption layer (first layer) and the inscription medium (second layer) in the present process are separate layers or layer systems which are separated at least by a support layer. Therefore, the layer (13) of Shimokawa may not be, at the same time, part of the absorption layer and part of the inscription medium, as said layers.

In order to illustrate the claimed process (although not to be treated as limiting of the claims), a sketch is provided below, which is based on the simplest layer system according to present Fig. 2.



- (1'') support film,
- (2) first layer comprising energy absorber'
- (3) second layer comprising colorant and polymer component (inscription medium),
- (a) colored inscription or marking containing colorant and polymer component of layer (3) which has been molten during laser action and transferred to the plastic surface, i.e., welded to the plastic surface,
- (b) plastic surface to be marked.

Compare the above with Fig. 4 of Shimokawa (illustration below).



- (13) transparent or translucent film (see column 3, line 31),
- (11) color film (see column 3, line 30),
- (12) adhesive (see column 3, line 31),
- (11a) hole in the color film 11, the material has been “melted away,” i.e., vaporized, ablated, by laser (see column 3, line 60 to column 4 line 1 and column 4, lines 9-11),
- (10a) hole in the work 10, the material has been “melted away,” i.e., vaporized, ablated, by laser (see column 3, line 60 to column 4 line 1 and column 4, lines 9-11),
- (10) marking surface, i.e., cow1 panel, which is also identified as work 1 (see column 3, lines 29 and 47, and column 4, lines 1, and 10-11).

The differences of both processes hopefully are clearly illustrated above. One leaves a colored inscription or marking on the surface of the material to be marked, while the other ablates some of the material to form a hole. One involves the transfer of material to the surface to be marked, while the other does not, but instead material is removed therefrom by melting away.

Noting in the cited art teaches or suggests a process as in the claimed invention for reasons set forth herein and in the last reply. Absent hindsight construction from the disclosure/claims of applicants, one would not even be able to form the claimed invention from the disclosures of the cited art. The tendency to resort to hindsight based upon applicant’s disclosure may often be difficult to avoid due to the very nature of the examination process. However, impermissible hindsight must be avoided and legal

conclusions of obviousness must be reached on the basis of the facts gleaned from the prior art. (See MPEP 2142). In other words, both the features of the claims and reason to modify or combine the prior art, must be found somewhere other than in Applicant's disclosure, which does not seem to be the case herein.

Withdrawal of the rejection is respectfully and courteously requested.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,

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